Draft - Argonne Training Program on Extreme Scale Computing
Pheasant Run Resort - St. Charles, IL
July 28 through August 9, 2013

Sunday July 28		
4:00p.m.	Intro to Course	Paul Messina, ANL
5:00	Architecting for Exascale	Tryggve Fossum, Intel Corp. *Invited Speaker*
5:30	Dinner and Set up Computer Accounts	
	Quick Start: Running MPI Programs on the ALCF Blue Gene/Q	Ray Loy, ANL
	A Crash Course on Vesta and the ALCF	Lalitha Mantrala, ANL
9:00	Wrap-up	

Monday July 29		
7:30a.m.	Continental Breakfast	
8:30	Intro to Parallel Supercomputers	Pete Beckman, ANL
9:00	Macro Architecture for Exascale	Pavan Balaji, ANL
10:00	Break	
10:30	Micro Architecture for Exascale	Tryggve Fossum, Intel Corp.
11:15	PIM & Memory: The Need for a Revolution in Architecture	Peter Kogge, Univ. of Notre Dame
12:15p.m.	Lunch and Hands-on Exercises	
1:15	Architectural Adaptions of Algorithms for Scientific and Engineering Simulation	David Keyes, KAUST
2:15	Programming Models for High-Performance Computing	Marc Snir, ANL
3:15	Break	
3:45	The Evolution of GPU Accelerated Computing	Steve Parker, NVIDIA
4:30	MPI for Scalable Computing	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
5:30	Dinner and *"Grid, Cloud, and Beyond: What we have learned about computing on demand"*	Ian Foster, ANL/Uchicago - *Invited Speaker*
6:30	MPI and Hands-on	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
9:30	Wrap-up	

Tuesday July 30		
7:30a.m.	Continental Breakfast	
8:30	MPI for Scalable Computing (continued from yesterday)	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
	Hands-on	
	Code Description	
10:00	Break	
10:30	MPI for Scalable Computing (continued)	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
12:00p.m.	Lunch and Hands-on Exercises	
1:00	MPI for Scalable Computing (continued)	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
3:00	Break	

3:30	MPI for Scalable Computing (continued)	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
5:30	Dinner and *"Post-doctoral Petascale Computing or: How I Learned to Stop Worrying and Blow Up Stars"*	Sean Couch, Univ. of Chicago - *Invited Speaker*
6:30	MPI Hands-on Exercise	Bill Gropp, UIUC, Rajeev Thakur, Rusty Lusk, ANL
9:30	Wrap-up	

Wednesday July 31

7:30a.m.	Continental Breakfast	
8:30	Combining Performance and Portability	Jeff Hammond, ANL
	Performance and Portortability Lessons from HACC	Salman Habib, ANL
10:00	Break	
10:30	Performance in the HACC Cosmology Framework	Hal Finkel, ANL
	Scientific Computing on Graphics Processing Units	Nick Frontiere, ANL
12:00p.m.	Lunch and Hands-on Exercises	
1:00	Programming with Parallel Migratable Objects	Sanjay Kale, Eric Bohm, and Nikhil Jain, UIUC
3:00	Break	
3:30	Runtime Adaptivity with Migratable Objects using Charm++	Sanjay Kale, Eric Bohm, and Nikhil Jain, UIUC
5:30	Dinner and *"Large-Scale Visual Analysis"*	Chris Johnson, Univ. of Utah - *Invited Speaker*
6:30	Hands-on Exercise	
9:30	Wrap-up	

Thursday August 1

7:30a.m.	Continental Breakfast	
8:30	Using OpenMP for Intranode Parallelism Tutorial Overview	Bronis de Supinski, LLNL, Paul Petersen, Intel
10:00	Break	
10:30	Using OpenMP for Intranode Parallelism Useful Information	Bronis de Supinski, LLNL, Paul Petersen, Intel
12:00p.m.	Lunch and Hands-on Exercises	
1:00	Partitioned Global Address Space Languages	Kathy Yelick, LBNL and UC Berkeley
3:00	Break	
3:30	Multiresolution Global-View Programming in Chapel	Brad Chamberlain, Cray Inc.
5:30	Dinner Talk *"Scientific Computing while Supercomputing"*	Aron Ahmadia, Continuum Analytics - *Invited Speaker*
6:30	Using OpenMP for Intranode Parallelism Open MP 4.0 and the Future of OpenMP	Bronis de Supinski, LLNL, Paul Petersen, Intel
	Writing Parallel Programs that Work	
	Hands-on OpenMP	
9:30	Wrap-up	

Friday August 2

7:30a.m.	Continental Breakfast	
8:30	MPI and Hybrid Programming	Bill Gropp, UIUC
9:30	Programming Heterogeneous (GPU) Systems	Jeff Vetter, Bronson Messer, ORNL
10:30	Break	

11:00	An Introduction to OpenACC: There is No Such Thing as a Free Lunch, but Some Things Taste Better Than Others.	Jeff Vetter, Bronson Messer, ORNL
12:00p.m.	Lunch and Hands-on Exercises	
1:00	High-Performance with Accelerator Programming	Jeff Vetter, Bronson Messer, ORNL
2:00	FASTMath: An Overview of Mathematical Algorithms and Software	Lori Diachin, LLNL
2:30	The Portable Extensible Toolkit for Scientific Computing	Barry Smith, ANL
	Algebraic Solvers in FASTMath	Barry Smith, ANL
3:20	Break	
3:50	HYPRE: High Performance Preconditioners	Rob Falgout, LLNL
4:15	Sundials: Suite of Nonlinear and Differential/Algebraic Equation Solvers	Carol Woodward, LLNL
4:40	Unstructured Mesh Handling for Extreme-Scale Computing	Tim Tautges, ANL
5:30	Dinner and *"Teaming in the DOE Environment"*	Lori Diachin, LLNL - *Invited Speaker*
6:30	FASTMath Hands-on Exercises	Mark Miller, LLNL
9:30	Wrap-up	

Saturday August 3

7:30a.m.	Continental Breakfast	
8:30	Block Structured AMR Libraries and Their Interoperability with Other Math Libraries	Anshu Dubey, LBNL, Mark Adams, LBNL
9:30	Infrastructure for Parallel Adaptive Unstructured Mesh Simulations	Mark Shephard, RPI, Cameron Smith, RPI, Glen Hansen, SNL
10:20	Break	
10:50	FASTMath Hands-on Exercises	Mark Miller, LLNL
12:00p.m.	Lunch and Hands-on Exercises	
1:00	Wrap-up	

Sunday August 4

	OFF	

Monday August 5

7:30a.m.	Continental Breakfast	
8:30	Software Engineering and process for scientific computing	Anshu Dubey, LBNL, Katherine Riley, ANL
9:15	Software Engineering and Architecting Scientific Codes	Anshu Dubey, LBNL, Hal Finkel, ANL
10:00	Break	
10:30	As it Applies to Core-collapse Supernova	Sean Couch, UChicago
11:30	Software Process for Maintainable Code (Policies, Testing Distribution etc etc)	Anshu Dubey, LBNL, Katherine Riley, ANL
12:30p.m.	Lunch and Hands-on Exercises	
1:30	Overview of Performance Tools on Mira	Scott Parker, ANL
1:50	Overview of Performance Tools on Titan	Mike Brim, ORNL

2:15	Performance tools for massively parallel systems: state of the art and challenges ahead	John Mellor-Crummey, Rice University
3:00	Break	
3:30	Perspectives on Performance Tools for Exascale: Experiences with TAU	Allen Malony, Univ. of Oregon
4:30	Large Scale Debugging on Titan & Mira with DDT	David Lecomber, Allinea Software Ltd
5:30	Dinner and *"Dawn of the Era of Quantum Computation"*	Bob Lucas, USC-ISI - *Invited Speaker*
6:30	Hands-on	
9:30	Wrap-up	

Tuesday August 6

7:30a.m.	Continental Breakfast	
8:30	Communication-Avoiding Algorithms	Jim Demmel, UC Berkeley
10:00	Break	
10:30	Workflow Techniques for Extreme-Scale Computing	Mike Wilde, ANL
12:00p.m.	Lunch and Hands-on Exercises	
1:00	Visualization Intro	Mike Papka, Tom Peterka, ANL
2:00	Visualization and Analysis of Massive Data With VisIT	Hank Childs, Lawrence Berkeley/Univ. of Oregon
3:00	Break	
3:30	Scientific Visualization with a ParaView	David DeMarle, Kitware, Inc.
4:30	Success Stories	Tom Peterka, Mark Hereld, Mike Papka, ANL
5:30	Dinner Talk *"Title TBD"*	Charlie Catlett, ANL - *Invited Speaker*
6:30	Hands-on	
9:30	Wrap-up	

Wednesday August 7

7:30a.m.	Continental Breakfast	
8:30	Introduction/Overview	Rob Ross, Rob Latham, ANL
8:45	Parallel File Systems (GPFS, Lustre)	
10:00	Break	
10:30	Leadership Computing Storage Architecture, Including I/O Forwarding	
11:00	Darshan and Characterization at Leadership Scale	
11:30	MPI-IO	
12:00p.m.	Lunch and Hands-on Exercises	
1:00	Parallel-NetCDF	
1:00	HDF5	Quincey Koziol, The HDF Group
3:00	Break	
3:30	I/O Tuning Overview	
4:00	Parallel I/O Wrapup and Additional Resources	Rob Ross, Rob Latham, ANL
4:30	Data Transfer and Sharing with Globus Online	Steve Tuecke, Univ. of Chicago
5:30	Dinner Talk "Title TBD"	Mark Peters, ANL - *Invited Speaker*

6:30	Hands-on	
9:30	Wrap-up	

Thursday August 8

7:30a.m.	Continental Breakfast	
8:30	Community Codes: How They Develop and What it Takes to Develop One	Anshu Dubey, LBNL
10:00	Break	
10:30	Community Codes: How They Develop and What it Takes to Develop One	Anshu Dubey, LBNL
12:00p.m.	Lunch and Hands-on Exercises	
1:00	Application Case Studies	Hal Finkel, ANL
2:15	Break	
2:45	Application Case Studies	Jim Philiips, UIUC
4:00	Application Case Studies	Jeff Hammond, ANL
5:30	Dinner Talk "Title TBD"	Alok Choudhary, Norhwestern Univ. - *Invited Speaker*
6:30	Hands-on	
9:30	Wrap-up	

Friday August 9

7:30a.m.	Continental Breakfast	
8:30	EXAM	
10:00	Break	
10:30	Adaptive Linear Solvers and Eigensolvers	Jack Dongarra, Univ. Tennessee, Knoxville
12:00p.m.	Wrap-up	
	Thank you and Safe Travels	